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On the Causes of Fires in London during the Twenty-four Years from 1833 *to* 1856 *inclusive; with some Remarks on the Deduction of correct Rates of Premium for Fire Insurances. By* CHARLES GEORGE FOTHERGILL, *of the Westminster Fire Office.*

[Read before the Institute, 27th April, 1857, and ordered by the Council to be printed.]

WITH the view of turning to some further account the information afforded by the periodical reports of fires in the metropolis furnished by the London Fire-Engine Establishment to the Offices supporting it, and extending now over a term of twenty-four years, I have drawn out some results in a tabular form, and have attached to them a few comments more suggestive than at present available; premising that these results are necessarily of limited value, in consequence of the indefiniteness of the data in many essential respects. For Mr. Braidwood's kind assistance I take this opportunity of expressing my obligations; and especially I am indebted to Mr. W. M. Browne, Secretary of the Westminster Fire Office, for the readiness with which he has placed the results of his experience at my disposal.

The present is, as far as I am aware, the only attempt which has been made to utilize these returns in a novel form, since Mr. Samuel Brown's very interesting paper published in the 1st volume of the *Assurance Magazine*, in 1851. The principal object of that paper, from an insurance point of view, and *in its practical bearing*, was to deduce the appropriate rate of premium for each particular risk, by instituting a comparison between the number of casualties in each trade and the total number of persons carrying on such trade; and, for reasons which I shall refer to subsequently, Mr. Brown's labours have not availed to give a result to be depended on.

The chief purpose in preparing the present paper was to ascertain as far as possible *the intensity of each cause of fire in each particular trade*—more with the view of rendering the returns in some slight degree useful to Fire Office surveyors and inspectors of risks than to attempt to deduce the appropriate rate of premium, though a few remarks are also made on the latter point, further on.

The total number of fires (exclusive of false alarms and chimney alarms) attended by the London Fire Brigade, during the twenty-four years ending 31st December, 1856, was 17,816, giving an average of 742 in each year, or almost exactly two in every twenty-four hours. For the last eight years the average is 2½ for the same term; and for the last three years, 2·64.

The proportional intensity of the fires over two portions of the above period is shown by the following classification:—

Average number of Fires in each Year.

		Totally destroyed.	Considerably damaged.	Slightly damaged.	Total.
For 16 years . .	1833 to 1848	26·4	194·2	433·5	654·1
For 8 years . . .	1849 „ 1856	26·7	273·9	618·	918·6

Whence it will be apparent that, while the total yearly average has advanced in the last eight years by about 40 per cent. as compared with the previous sixteen years, the number involving entire destruction has remained almost stationary. The number "considerably damaged," also, has increased only just in proportion to the total increase. These facts supply satisfactory and convincing testimony to the efficiency of the force whose duty it is to cope with these calamitous occurrences.

In the accompanying table, the whole number of trades and fires mentioned above is not included; those trades being omitted which, either from their rarity or the comparative infrequency of their appearance in the returns, do not present a result sufficiently

For Twenty-four Years: from 1 *January,*

Trades, &c.	Total No. of Fires in each Trade.	No. per cent.			No. per cent.	
		Totally Destroyed.	Considerably Damaged.	Slightly Damaged.	Special causes connected with Trade and not found in subsequent columns.	
Apothecaries, and dealers in drugs; but no chymical works done	77	3·9	45·4	50·7	Experiments, 1·3; bottles bursting, 1·3; composition boiling over, 1·3; trade, 7·8	11·7
Bagnios . . .	85	. .	25·9	74·1	Intoxication, 5·9	5·9
Bakers, ordinary (exclusive of sea biscuit, pie, & muffin bakers)	366	3·8	29·2	67·	Ovens overheated, &c., 10·1; upsets put away hot and on fire, upsets taking fire, and other trade causes, 31·7	41·8
Barge and boat builders	26	. .	23·1	76·9	Boiling pitch, 11·5; breaming a barge, 3·85; dressing a boat, 3·85; trade, 42·3	61·5
Basket makers . .	20	15·	45·	40·	Bleaching baskets, 5·; spontaneous, 5·; trade, 10·	20·
Beer shops . .	184	2·7	35·3	62·	. . . . . .	. .
Blacking makers .	10	. .	30·	70·	. . . . . .	. .
Booksellers, Bookbinders, and Stationers	265	1·1	45·3	53·6	Trade, 2·6	2·6
Brewers . . .	26	3·85	50·	46·15	Spontaneous, 7·75; trade, 23·	30·75
Brokers and dealers in old clothes	168	4·2	43·4	52·4	Trade, 1·8	1·8

definite to be worth registering. For the former reason, such trades as archel makers, asphalte works, bath keepers, &c.—and for the latter reason, such as butchers, cheesemongers, &c.—do not appear in the table, though all have contributed to the conflagrations of the twenty-four years.

Of the total number of fires occurring, in all 17,816 (3·6 per cent. of which were totally destroyed, 29·7 per cent. considerably damaged, and 66·7 per cent. slightly damaged), the table comprises 16,420, including 586 out of the 637 fires attended with entire destruction, and divided thus—

Totally destroyed . . .	3·6 per cent.
Considerably damaged . . .	28·9 „
Slightly damaged . . .	67·5 „

The percentage of each cause of fire, for each trade and classification enumerated, is shown in the following table; but in viewing these results it must be borne in mind that if a fire take place in the *dwelling* portion of a tradesman's premises, it is included under the designation "private," the only casualties entered among the fires of the trade being such as take place in the business part of the premises. The only exceptions to this rule are in the case of public houses, coffee shops, eating houses, lodgings, and bagnios.

1833, *to* 31 *December*, 1856.

ATTRIBUTABLE TO																
Candles and lamps.	Curtains and hangings generally.	Gas.	Accidents.	Carelessness.	Children playing with fire, lucifers, gunpowder, &c.	Sparks from fires, &c.	Fires kindled on hearths and other improper places.	Flues: overheated, blocked up, foul, and defective.	Furnaces.	Lucifers.	Stoves: defective, overheated, &c. (not drying stoves).	Suspicious.	Smoking tobacco.	Wilful.	Unknown.	Various.
1·3	1·3	13·	1·3	2·6	..	..	..	6·5	1·3	..	1·3	1·3	..	1·3	53·2	3·9
18·8	55·3	1·2	..	..	..	..	..	1·2	..	..	1·2	..	1·2	1·2	11·7	2·3
6·8	·3	7·9	..	·8	·3	1·7	·3	10·7	·5	·8	1·7	..	·5	..	24·	1·9
..	..	..	..	..	..	..	..	11·5	3·85	..	..	3·85	..	3·85	15·45	..
10·	..	5·	..	..	..	..	..	..	..	..	..	..	5·	..	60·	..
8·7	8·15	11·9	..	·5	..	3·3	..	8·15	..	·5	2·7	2·2	5·5	..	42·9	5·5
30·	..	10·	..	..	..	..	..	20·	10·	..	..	..	..	..	30·	..
10·5	·8	20·7	·4	1·2	3·	1·9	·4	8·6	·4	2·3	3·8	·4	·8	·4	28·6	13·2
11·5	..	7·8	..	..	..	..	..	11·5	..	..	3·85	..	..	..	30·75	3·85
17·2	4·8	6·6	..	..	1·2	2·9	1·8	5·3	·6	1·8	1·8	·6	·6	·6	47·6	4·8

TRADES, &c.	Total No. of Fires in each Trade.	No. per cent.			No. per cent.	
		Totally Destroyed.	Considerably Damaged.	Slightly Damaged.	Special causes connected with Trade and not found in subsequent columns.	
Builders	123	20·3	39·	40·7	Lime overheating, 7·3; lime slacking, 2·5; lampblack overheating, ·8; spontaneous, 1·6; drying room, ·8; boiling pitch, ·8; shavings ignited, ·8; trade, 4·9	19·5
Cabinet makers	301	9·6	47·9	42·5	Loose shavings ignited, ·33; trade, 15·3	15·6
Caoutchouc manufacturers	17	5·9	52·9	41·2	Heating solution, heat from boiler, &c.	41·2
Carpenters and workers in wood; not cabinet makers	757	7·8	40·3	51·9	Heating glue and solution, boiling pitch, tiring wheels, hot ashes and cinders, &c.	19·7
Chandlers; not tallow chandlers	253	4·3	37·6	58·1	Boiling pitch, mixing sulphur, &c.	1·6
Churches and chapels	57	8·8	22·8	68·4	Lightning, 3·5; Bude light, 1·8; light in vault at a funeral, 1·8; repairing organ, 1·8	8·8
Chymists (including laboratories)	71	2·8	45·1	52·1	Explosions, carboy of sulphuric acid bursting, overheat of retort, retort bursting, still-lid blowing off, hydrogen firing, boiler leaking, heat from boiler, phosphorus igniting, spontaneous	73·3
Coachmakers	57	10·5	40·4	49·1	Lampblack overheating, 7·; smith's forge, 1·8; trade, 8·8	17·5
Coffee shops and chop houses	185	2·2	25·9	71·9	Hot plates, 1·1; ovens, ·5; trade, 1·1	2·7
Colour makers	33	..	45·5	54·5	Copper improperly set, 3·; contents of copper boiling over, 3·; overheat of drying furnace, 3·; overheat of drying stove, 3·; spontaneous ignition of sweepings, 3·; trade, 45·5	60·6
Confectioners and pastry cooks	79	1·3	35·4	63·3	Hot plate, 6·3; boiling sugar, 1·3; oven, 3·8; muffin stove, 1·3; trade, 16·4	29·1
Coopers	53	13·2	32·1	54·7	Firing casks, 5·6; cooper's devil, 2·; trade, 9·4	17·
Cork burners	11	9·1	27·3	63·6	Burning cork, 9·1; cork put away on fire, 9·1; trade, 54·5	72·7
Cork cutters	20	20·	60·	20·	Burning cork, 5·; trade, 5·	10·
Corn chandlers	71	9·9	66·2	23·9	Overheat of kiln, 1·4; trade, 2·8	4·2
Curriers	41	9·8	43·9	46·3	Wax boiling over, 2·4; friction, 2·4; trade, 9·8	14·6
Distillers	35	2·9	57·1	40·	Escape of spirit from still, 8·6; leakage of stillhead, 2·9; drawing off spirits, 2·9; spirit boiling over, 2·9; boiling varnish, 2·9; escape of hydrogen from manhole, 2·9; repairing vat, 2·9; trade, 42·4	68·4
Ditto, Illicit	17	..	41·2	58·8	Stillhead blowing off, 29·4; spirit boiling over, 5·9; trade, 47·	82·3
Ditto, Naphtha	9	22·2	44·5	33·3	Stillhead blowing off, 11·1; experiment, 11·1; trade, 33·3	55·5
Ditto, Tar	21	19·	57·1	23·9	Warming top of tank, 4·8; tar boiling over, 4·8; drawing off pitch, 4·8; explosion, 4·8; stillhead blowing off, 4·8; melting pan bursting, 4·8; heat from boiler, 4·8; boiler leaking, 9·5; trade, 38·1	80·9
Ditto, Turpentine	8	50·	25·	25·	Leak in stillhead, 12·5; pipe of still bursting, 12·5; trade, 25·	50·
Docks	16	..	37·5	62·5	Spontaneous combustion of cotton waste, 12·5; ditto of sea grass and oil, 6·25; lime overheating, 6·25; other spontaneous combustion, 6·25; cask of spirits falling, 6·25	37·5
Drapers (woollen and linen) and Mercers	455	2·	41·7	56·3	.. .. ..	..
Dyers	30	..	43·3	56·7	Spirit overflowing from a still, 3·3; overheat of still, 3·3; hydrochloric acid boiling over, 3·3; turpentine upset on kitchen fire, 3·3; trade, 26·7	40·
Eating houses	124	1·6	16·1	82·3	Oven, 3·2; hot plate, 2·4; steam furnace, 1·6; overheat of steam boiler, 1·6; cooking, ·8; trade, 16·9	26·6
Engineers, mechanical	43	9·3	39·6	51·1	Steam boiler, 4·6; casting, 2·3; spontaneous combustion of coal dust, 2·3; lampblack, 2·3; lime, 2·3	13·9

ATTRIBUTABLE TO

Candles and lamps.	Curtains and hangings generally.	Gas.	Accidents.	Carelessness.	Children playing with fire, lucifers, gunpowder, &c.	Sparks from fires, &c.	Fires kindled on hearths and other improper places.	Flues: overheated, blocked up, foul, and defective.	Furnaces.	Lucifers.	Stoves: defective, overheated, &c. (not drying stoves).	Suspicious.	Smoking tobacco.	Wilful.	Unknown.	Various.
6·5	..	2·5	..	..	·8	7·3	·8	2·5	·8	·8	·8	1·6	1·6	..	54·5	
6·6	·66	2·	..	·33	·33	9·3	·66	4·9	·33	·33	3·6	..	·33	..	51·8	3·3
17·6	..	..	..	..	..	..	..	11·8	..	5·9	..	..	..	..	17·6	5·9
8·3	·4	2·6	·26	1·	1·1	7·	1·5	5·	·5	1·5	2·71	·13	1·2	·4	45·4	1·3
13·	4·3	18·5	·4	..	..	2·	·4	4·7	·4	2·	2·	·8	·4	..	46·7	2·8
1·8	..	17·5	..	3·5	..	..	1·8	26·3	7·	..	28·	..	..	..	5·3	
..	..	1·4	..	1·4	..	1·4	1·4	1·4	2·8	..	2·8	..	..	..	14·1	
5·3	..	..	..	..	..	..	1·8	12·2	1·8	1·8	3·5	..	1·8	..	54·3	
11·4	15·7	7·	..	·5	..	2·7	·5	16·8	..	..	7·	..	2·2	1·1	29·2	3·2
..	..	..	..	..	..	..	..	9·1	..	..	6·	..	..	..	24·3	
7·6	..	12·7	1·3	..	..	..	1·3	15·2	5·	..	2·5	..	..	..	24·	1·3
7·6	..	..	..	..	..	3·7	..	11·4	3·7	..	3·7	..	..	..	50·9	2·
..	..	9·1	..	..	..	..	..	..	9·1	..	..	..	..	..	9·1	
5·	..	5·	..	..	..	10·	..	..	..	..	15·	..	..	..	55·	
7·1	..	1·4	1·4	1·4	1·4	..	..	4·2	..	1·4	2·8	2·8	1·4	..	66·2	4·2
4·9	..	4·9	..	..	..	..	..	17·1	..	..	4·9	..	2·4	..	46·3	4·9
..	..	2·9	2·9	..	..	2·9	..	2·9	2·9	..	..	..	..	..	17·1	
..	..	..	..	..	..	..	..	5·9	..	..	..	..	..	..	11·8	
..	..	..	11·1	..	..	..	..	..	..	..	..	..	..	..	33·4	
4·8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	14·3	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	50·	
*18·75	..	..	..	6·25	..	..	..	..	6·25	..	..	..	6·25	..	12·5	12·5
6·6	2·4	52·8	..	·4	..	·4	..	4·9	..	·4	1·6	·4	·4	·9	27·9	·9
..	..	10·	..	..	..	..	..	20·	3·3	..	..	..	..	..	20·	6·7
4·8	9·7	7·3	..	..	..	·8	..	23·4	..	..	4·	..	..	·8	18·6	4·
4·6	..	2·3	..	..	..	..	..	18·6	6·9	..	..	..	..	..	41·9	11·6

* Candles, 6·25; lamps, 12·5.

TRADES, &c.	Total No. of Fires in each Trade.	NO. PER CENT.			NO. PER CENT.	
		Totally Destroyed.	Considerably Damaged.	Slightly Damaged.	Special causes connected with Trade and not found in subsequent columns.	
Farming stock	127	9·6	82·6	7·8	Spontaneous, 25·9; shooting birds, ·8; spark from locomotive, ·8; railway, ·8; trade, 1·6	29·9
Feather merchants and dressers	24	4·2	50·	45·8	Oven, 4·2; heat of boiler, 4·2; trade, 20·8	29·2
Fellmongers	17	5·9	82·4	11·7	Drying stoves, 58·9; trade, 17·6	76·5
Firework makers	72	11·1	61·1	27·8	Explosion, 19·4; spontaneous, 6·9; letting off fireworks, 5·6; making fireworks, 1·4; composition upset, 1·4; boiling composition, 1·4; trade, 45·8	81·9
Flax dressers	17	11·8	29·4	58·8	Friction, 23·5; spontaneous, 5·9; trade, 29·4	58·8
Floorcloth manufacturers	11	45·4	36·4	18·2	Varnish boiling over, 9·1; trade, 63·6	72·7
Founders	61	..	39·3	60·7	Spontaneous, 1·6; metal upsetting, 1·6; overheat of castings, 1·6; spark from castings, 1·6; overflowing of metal, 1·6; mould bursting, 1·6; trade, 34·4	44·3
Furriers and skin dyers	51	5·9	49·	45·1	Drying stove, 4·; pitch pot boiling over, 2·; copper fire, 2·; trade, 2·	9·8
Gas works	56	..	26·8	73·2	Explosion, 7·1; coke put away hot, 5·4; opening a pipe, 1·8; stoppage in condenser, 1·8; lampblack overheating, 1·8; tar taking fire, 1·8; tar pipe bursting, 1·8; tar tank leaking, 1·8; vat leaking, 1·8; trade, 46·4	71·4
Grocers	199	7·5	49·8	42·7	Boiling sugar, ·5; trade, 2·	2·5
Hatters and hat makers	153	4·6	61·4	34·	Drying stove, 1·3; boiling proofing, 1·3; varnish boiling over, ·7; hatter's stove, ·7; ironing stove, ·7; turpentine upset, ·7; melting gum, ·7; copper, ·7; trade, 22·9	29·4
Japanners	38	5·2	63·2	31·6	Drying stove, 26·3; oil boiling over, 7·9; japan boiling over, 2·6; trade, 36·8	73·7
Lampblack makers	25	4·	48·	48·	Trade, 44·	44·
Laundresses	57	3·5	33·3	63·2	Ironing stove, 24·6; pipe stove, 5·3; drying stove, 3·5; drying linen, 3·5; trade, 21·1	57·9
Lodgings	1568	·13	12·63	87·24	.. .. ..	..
Lucifer match makers	129	..	56·6	43·4	Drying stove, 3·1; drying room, ·8; heat from sun, 2·3; composition boiling over, 1·6; heat from boiler, ·8; drying splints over boiler, ·8; friction, ·8; lightning, ·8; trade, 63·4	74·4
Maltsters	12	16·7	50·	33·3	Kiln, 16·7; heat from malt, 8·3; trade, 33·4	58·4
Manchester warehouses	70	1·4	30·	68·6	Drying lace, 1·4; spontaneous, 1·4	2·8
Marine store dealers	95	5·3	30·5	64·2	Rags overheating, 1·1; melting pan, 1·1; trade, 7·4	9·5
Mast and block makers	7	28·6	28·6	42·8	Trade, 14·3	14·3
Millers	3	100·	..	..	Trade, 33·3	33·3
Mills, steam	13	23·1	30·8	46·1	Friction, 15·4; trade, 46·1	61·5
Musical instrument makers	54	5·6	61·1	33·3	Trade, 7·4	7·4
Oilmen and colourmen, not colour makers	297	5·7	39·7	54·6	Boiling tar, 1·; boiling varnish, 1·3; heating turpentine, ·34; melting grease, ·34; making French polish, ·34; making sealing composition, ·34; still-head blowing off, ·34; carboy of French polish bursting, ·34; spilling turpentine, 1·; drawing off turpentine, 1·3; candle falling into turpentine, ·34; turpentine leaking, ·7; drawing off naphtha, ·7; drawing off varnish, ·34; drawing off tar, ·34; gunpowder, 1·; spontaneous (guano, oil, and sawdust, &c.), 4·4; melting resin, ·34; trade, 12·1	26·9
Oil works	12	16·7	75·	8·3	Spontaneous, 25·; refining oil, 8·3; trade, 16·7	50·
Painted baize makers	20	15·	70·	15·	Drying stove, 20·; boiling oil, 10·; trade, 25·	55·
Painters, plumbers, and glaziers	45	2·2	51·1	46·7	Spontaneous, 11·1; boiling oil, 4·4; drawing off turpentine, 2·2; melting pot, 2·2; trade, 8·9	28·8
Paper mills	7	14·3	71·4	14·3	Drying stove, 14·3	14·3
Paper stainers	29	3·4	41·4	55·2	Drying stove, 10·3; drying paper, 6·9; trade, 17·2	34·4

ATTRIBUTABLE TO																
Candles and lamps.	Curtains and hangings generally.	Gas.	Accidents.	Carelessness.	Children playing with fire, lucifers, gunpowder, &c.	Sparks from fires, &c.	Fires kindled on hearths and other improper places.	Flues: overheated, blocked up, foul, and defective.	Furnaces.	Lucifers.	Stoves: defective, overheated, &c. (not drying stoves).	Suspicious.	Smoking tobacco.	Wilful.	Unknown.	Various.
·8	..	..	..	·8	3·9	..	..	·8	..	·8	..	10·2	1·6	14·4	34·6	2·4
4·2	4·2	..	..	..	..	..	..	20·8	..	..	20·8	..	..	..	16·6	4·2
5·9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	17·6	..
1·4	..	..	..	1·4	1·4	2·8	..	..	..	..	..	..	1·4	..	9·7	..
..	..	5·9	5·9	..	5·9	..	..	..	..	..	..	..	..	..	23·5	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	27·3	..
..	..	..	..	1·6	..	1·6	..	4·9	16·4	..	4·9	..	..	1·6	21·3	3·3
11·8	..	..	..	2·	..	..	..	11·8	..	..	2·	..	2·	..	52·9	7·8
..	..	23·2	..	..	..	..	..	..	..	..	..	..	..	..	5·4	..
8·6	..	17·6	..	·5	·5	1·5	..	5·	..	3·	1·5	·5	..	1·	55·3	2·5
3·3	..	5·9	..	..	..	..	..	8·5	·7	..	2·	·7	·7	·7	47·	1·3
..	..	..	..	..	..	..	..	10·5	..	..	..	..	..	..	15·8	..
..	..	..	..	..	..	..	..	4·	12·	..	8·	..	..	..	32·	..
3·5	7·	..	..	..	1·8	7·	..	5·3	..	3·5	*See* Trade	..	..	..	12·2	1·8
15·7	35·4	1·6	·3	·2	5·1	6·8	·6	7·3	·06	2·5	·7	·5	1·8	·3	14·4	6·8
..	·8	..	..	·8	..	2·3	..	..	..	*See* Trade	3·9	..	..	..	16·3	1·6
..	..	..	..	..	..	..	..	8·3	8·3	..	..	..	..	..	25·	..
5·7	1·4	11·4	..	1·4	..	..	4·3	18·6	1·4	..	5·7	..	..	1·4	34·3	11·4
15·8	5·3	4·2	..	1·1	..	4·2	..	12·6	..	1·1	2·1	..	1·1	1·1	40·	2·1
..	..	..	..	..	..	..	..	..	..	..	..	14·3	..	14·3	57·1	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	66·7	..
..	..	..	..	..	..	..	..	15·4	..	..	..	..	7·7	..	15·4	..
3·7	..	..	..	..	..	1·9	..	9·2	..	..	14·8	1·9	..	..	55·5	5·6
10·4	·7	6·4	..	1·3	·7	·34	·7	3·4	·34	1·7	·34	·34	1·	·34	42·4	2·7
..	..	..	..	..	..	.	..	..	..	..	..	..	..	..	50·	.
..	..	..	..	..	..	..	..	5·	..	..	10·	..	..	..	30·	..
4·4	..	2·2	..	2·2	..	..	..	6·7	..	..	..	..	2·2	..	53·3	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	28·6	57·1	..
10·3	3·4	..	..	..	..	..	3·4	3·4	6·9	..	13·8	..	..	..	24·4	..

TRADES, &c.	Total No. of Fires in each Trade.	NO PER CENT.			NO. PER CENT.	
		Totally Destroyed.	Considerably Damaged.	Slightly Damaged.	Special causes connected with Trade and not found in subsequent columns.	
Pawnbrokers . .	35	11·4	51·4	37·2	.. ..	..
Printers and engravers	133	3·	39·1	57·9	Steam engine, 3·8; boiling oil, 1·5; boiling tar, ·7; spontaneous, 1·5; drying stove, ·7; drying paper, ·7; trade, 9·8	18·8
Printers (copper plate) .	28	..	53·6	46·4	Drying stove, 3·6; boiling oil, 3·6; trade, 32·1 .	39·3
Printers' ink makers .	6	16·6	83·4	..	Oil boiling over, 16·6; explosion, 16·6; trade, 66·8	100·
Private . . .	5197	·9	16·3	82·8	.. .. ..	..
Public buildings . .	48	10·4	20·8	68·8	.. .. ..	..
Rag merchants . .	55	7·3	43·6	49·1	Spontaneous, 14·5; drying stoves, 5·4; trade, 12·7	32·7
Railways . . .	42	7·3	26·1	66·6	Spontaneous, 14·3; cinders from locomotive, 7·1; paint store, 4·8; forge, 2·4; trade, 7·1	35·7
Rope makers . .	44	11·4	54·5	34·1	Tar boiling over, leakage, &c., 36·4 . . .	36·4
Sale shops and offices .	846	4·5	28·9	66·6	Spontaneous, ·3; trade, ·7	1·
Saw mills, steam .	88	13·7	45·4	40·9	Steam boiler, 7·9; steam boiler exploding, 2·3; steam engine, 3·4; friction, 5·7; drying stove, 3·4; spontaneous, 1·1; explosion, 1·1; trade, 7·9	32·9
Ships (not steam) .	113	·9	37·2	61·9	Spontaneous, 12·4; heating pitch, 2·7; breaming a boat, ·9; repairs, 1·7; steam, ·9	18·6
Ships, steam . .	29	..	44·8	55·2	Steam, 6·9; steam engine, 6·9; boiler, 10·4; boiler exploding, 6·9; spontaneous, 3·4; trade, 31·	65·5
Ship builders . .	38	5·2	39·5	55·3	Pitch pot boiling over, 23·7; trade, 23·7 .	47·4
Stables . . .	326	5·5	38·	56·5	Spontaneous, 2·5; boiling tar, 1·2; boiling composition, ·3; singeing a horse, ·3; trade, 1·5	5·8
Sugar refiners . .	24	16·7	45·8	37·5	Packing, 4·2; lamp in stove, 4·2; charcoal furnace, 4·2; heat from boiler, 4·2; steam boiler exploding, 4·2; trade, 12·3	33·3
Tailors . . .	174	1·1	48·3	50·6	Trade, 3·4	3·4
Tallow chandlers and melters; wax chandlers and soap boilers	102	7·8	42·2	50·	Tallow boiling over, 4·9; wax boiling over, 1·9; boiling oil, 1·; copper leaking, 1·; spontaneous, 3·9; trade, 29·4	42·1
Tarpaulin makers .	19	10·5	42·1	47·4	Spontaneous, 21·; boiling oil, 10·5; tar pot upset, 5·3; trade, 5·3	42·1
Theatres . . .	34	17·6	..	82·4	Fireworks, 11·8; trade, 2·9	14·7
Tinmen, braziers, and smiths . . .	199	3·	27·6	69·4	Hot ashes, 2·5; forge fire, 3·; hot charcoal, 1·; charcoal pan, ·5; fire pan, ·5; brazier's stove, ·5; hot iron, 1·; overheating, ·5; heat from boiler, ·5; steam boiler bursting, ·5; friction, ·5; spontaneous, ·5; trade, 18·1	29·6
Under repair and building	187	15·	23·	62·	Lime overheating, 10·2; heating glue, 2·7; pitch pot boiling over, 2·1; burning shavings, 1·; chafing dish, 1·; drying house, ·5; repairs, 8·; trade, 8·	33·7
Unoccupied . .	101	7·9	20·8	71·3	Spontaneous, 1·; boiling tar, 1·; drying house, 2·; repairs, 1·; trade, 1·	5·9
Varnish makers . .	30	6·7	50·	43·3	Varnish boiling over, 26·7; oil boiling over, 6·7; overheat of still, 3·3; turpentine leaking, 3·3; trade, 36·7	76·7
Victuallers . . .	842	3·4	30·	66·6	Drawing off spirit, ·5; filling spirit cask, ·1; spirit overflowing, ·1; spontaneous, ·1; trade, 1·	1·9
Wadding makers .	32	3·1	59·4	37·5	Heat from boiler, 6·3; steam boiler, 6·3; drying cotton over boiler, 3·1; drying room, 3·1; friction, 3·1; trade, 34·4	56·3
Warehouses (not Manchester warehouses)	70	10·	32·9	57·1	Spontaneous combustion of rags, 5·7; ditto shoddy, 2·9; ditto cotton waste, 2·9; other spontaneous combustion, 1·4; explosion, 1·4; trade, 2·9	17·1
Wharfingers . .	29	6·9	17·2	75·9	Spontaneous, 27·6; explosion of barley dust, 3·4; explosion of naphtha cask, 3·4	34·5
Wine and spirit merchants . . .	134	1·5	20·2	78·3	Packing, 1·5; candles in split sticks, &c., 35·1 .	36·6
Wood merchants .	23	..	47·8	52·2	Sawing by candle light, 4·35	4·35
Wool staplers . .	9	11·1	44·4	44·4	Drying stove, 11·1; friction, 22·2 . . .	33·3

ATTRIBUTABLE TO

Candles and lamps.	Curtains and hangings generally.	Gas.	Accidents.	Carelessness.	Children playing with fire, lucifers, gunpowder, &c.	Sparks from fires, &c.	Fires kindled on hearths and other improper places.	Flues: overheated, blocked up, foul, and defective.	Furnaces.	Lucifers.	Stoves: defective, overheated, &c. (not drying stoves).	Suspicious.	Smoking tobacco.	Wilful.	Unknown.	Various.
5·7	2·8	14·4	..	2·8	..	..	..	11·5	..	2·8	..	..	..	..	60·	
1·5	..	10·5	..	2·3	..	·7	2·3	11·3	1·5	·7	7·5	1·5	..	..	39·	2·3
7·2	..	7·2	..	..	..	..	..	..	3·6	3·6	14·2	..	..	..	25·	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
12·9	33·5	1·5	..	·3	3·2	1·7	·6	14·8	..	·7	2·	·4	·8	·3	19·3	7·7
..	6·2	6·2	..	..	..	2·1	2·1	22·9	2·1	..	6·2	..	..	2·1	18·7	31·4*
7·3	..	..	..	..	..	3·7	3·7	5·4	..	..	5·4	..	..	..	36·3	5·5
4·8	..	4·8	..	..	..	4·8	..	7·1	..	..	4·8	..	..	..	33·3	4·8
4·5	..	..	..	..	2·3	..	..	2·3	..	..	..	4·5	2·3	..	40·9	6·8
8·9	1·7	24·4	·7	·7	·6	1·3	·3	9·6	·4	·7	5·2	·5	·8	·1	37·6	5·5
1·1	..	..	..	..	..	1·1	..	14·8	11·4	..	1·1	..	..	..	36·4	1·1
5·3	..	..	..	3·5	..	2·7	..	4·4	..	1·7	20·4	..	1·7	..	30·1	11·5
3·4	..	..	..	3·4	..	..	..	..	3·4	..	3·4	..	3·4	..	13·8	3·4
..	..	..	..	2·6	..	5·2	..	2·6	2·6	..	..	..	..	..	39·5	
19·	·3	·6	2·8	·9	2·1	·3	·9	5·2	·6	·6	1·8	1·5	3·4	1·2	48·5	4·3
4·2	..	..	..	..	..	4·2	..	20·8	.	..	..	..	..	..	37·5	
13·8	2·8	13·2	..	..	·6	4·	..	6·3	..	..	3·4	1·1	1·1	·6	44·8	4·6
5·9	..	1·	..	1·9	..	..	..	8·8	1·9	1·	1·	1·	..	..	33·3	1·9
..	..	..	..	..	.	..	..	..	..	..	10·5	..	..	..	47·4	
..	2·9	29·4	..	2·9	..	2·9	..	..	..	..	..	2·9	8·8	..	26·5	8·8†
6·5	..	2·	..	1·	..	4·5	2·	7·	6·	1·	5·	..	·5	..	32·2	2·5
3·2	..	2·1	..	2·7	..	3·2	13·4	7·5	·5	..	2·1	1·6	1·6	1·	24·6	2·7
2·	1·	7·9	..	1·	5·9	..	3·9	11·9	..	2·	..	6·9	3·	7·9	36·6	3·9
..	..	..	6·7	..	..	..	..	3·3	..	..	..	..	..	..	13·3	
8·3	10·8	12·3	..	·4	·4	1·5	·7	16·	·2	·7	4·1	·2	5·6	·2	31·9	4·9
..	..	..	..	3·1	..	..	..	..	..	..	21·9	..	..	3·1	12·5	3·1
5·7	..	2·9	..	1·4	..	1·4	..	8·6	..	..	2·9	..	..	8·6	47·1	4·3
3·4	..	10·4	..	3·4	..	3·4	..	..	..	..	3·4	6·9	6·9	10·4	17·2	
29·1	..	10·4	..	..	..	·7	·7	2·2	..	·7	1·5	..	..	1·5	14·2	2·2
13·	..	4·35	..	..	..	4·35	..	4·35	..	..	4·35	4·35	4·35	..	47·8	8·7
11·1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	33·3	22·2

* Thawing water pipe, fireworks, illumination, alterations, &c.

† Iron foundry adjoining, trying annihilator, and plumbers at work.

With reference to the causes of fires, as arranged in this table, it may be advisable to observe, that the description given in the returns of the London Fire-Engine Establishment has been in every instance as strictly followed as was compatible with the reduced number of headings here adopted, with a view to conciseness; of course, in some instances, a particular cause might probably be susceptible of an equally correct disposition under more than one column. Among the causes included under the heading "various" (and which amount to only 5·2 per cent. of all the fires embraced), are many of proportionally rare occurrence, and some rather curious; the following are examples:—"Sewing and reading in bed" (of which there are in all twenty-six cases in the twenty-four years), "hunting bugs," "thawing a waterpipe," "frying fish," "bottle of whiskey bursting," "suicide by charcoal," "warming a bed," "sealing a letter," &c. Several particular causes are placed sometimes as "various," sometimes as a special trade cause, according to the particular business in which the fire occurs: thus, three fires in private houses, occasioned by fireworks, are noted as "various," while the same cause operating among firework makers or theatres is mentioned as a trade cause in the first column.

In considering, in connection with the duties of an inspector of fire risks, the facts embodied in this table, it will be evident how much their value is impaired in consequence of there being no datum enabling us to estimate the *quantitative* as distinguished from the *qualitative* importance of each cause of fire: so that, although we can know for each trade the proportion of its damages referable to each cause, we are unable to ascertain (1) which of the causes originates the most serious damages, or (2) whether the intensity of the fire is *at all dependent* on the nature of the origin. It is true, that approximate information on the *first* point can be obtained from the *daily* reports of fires supplied by the Engine Establishment to the Fire Offices, but the question raised by the *second* point materially affects the value of such information for the purposes of the present paper. For instance, we may find that a cause A has originated *more serious* damages in a particular trade than another cause, B; but, on further investigation, it may very probably be ascertained that this is merely in consequence of the construction (or other conditions) of the risks involved in the former cases being the less favourable to a prompt suppression of the fire. The immense variety of the *conditions* attendant on any one risk almost precludes the possibility of attaching to each cause its correct quantitative value, under any system of registering the phenomena of fires.

The diversity in the proportional number of fires in each trade referable to any particular cause, as shown in the table, is very remarkable. Thus, for instance, while the aggregate experience of the whole table exhibits 32·6 per cent. of all the fires there included as caused by "candles," "curtains," or "gas" (divided thus—candles 10·2, curtains 15·7, gas 6·7),

Bagnios	show 75·3	per cent.	of their fires	as referable	to these three causes;
Drapers	61·8	„	„	„	„
Lodgings	52·7	„	„	„	„
Private houses	47·9	„	„	„	„
Blacking makers	40·	„	„	„	„

while in twenty-two trades out of the entire ninety-six there have not been any fires traced to these causes, though, in one of the trades so exempted (founders), there have been as many as sixty-one fires. A variety of interesting comparisons, similar to the above, as to stoves, flues, &c., can be easily seen by inspection, and are therefore not worth encumbering these pages with; and from a consideration of these facts, it follows (for instance) that the mode of fixing the lights and dressing the windows in a draper's shop, the setting of a stove or furnace in a church, &c., constitute important items in forming a correct estimation of the risk, and therefore deserve attention in granting an insurance.

The only comparison I have had the opportunity of making, between the results shown by this table and those derived from any other accessible source, is in the case of farming stock, which I have contrasted with a statement emanating from Mr. Beaumont, of the County Fire Office, and published in a very interesting and varied article in the *Quarterly Review* for December, 1854. From this statement, based on the experience of the County Fire Office for the first eleven months of 1853, it appears that 128 fires showed the following percentage of causes:—

Wilful	38·3
Lucifers	17·2
Lightning	13·3
Steam thrashing machines	1·6
General	29·7

while the 127 fires included in the table give

Wilful	14·4
Suspicious	10·2
Lucifers	·8
Railway	1·6
Spontaneous	25·9
Unknown	34·6
General	12·7

And it will be at once seen that there is an extent of discrepancy between these two results, which, although perhaps partly attributable to the great difference of the period embraced in either, must certainly be due in great part to some other influences: for (the widest diversity of the two sets of results being in connection with the fires caused by lucifer matches) we find, on confining our attention to the 57 fires attended by the London Brigade during the last eight years, only one (in 1850) traced to that origin, and the total percentage of causes for that term as follows:—

Wilful	5·3
Suspicious	17·2
Lucifers	1·8
Railway	1·8
Smoking tobacco	1·8
Spontaneous	26·3
Unknown	38·6
General	7·

It is very noticeable, that the most prominent cause (spontaneous) among the London returns is not mentioned specially in the County experience, although, no doubt, constituting part of the classification "general."

It detracts, of course, considerably from the value of the table of causes, that so large a proportion of them (amounting to 34·3 per cent. of the whole) are found classed as "unknown," or "trade" (meaning an unknown trade cause). This is, unfortunately, unavoidable, in consequence of conflagrations so frequently destroying all trace of their origin, especially in the case of the more serious fires. Where the number of unknown causes, indeed, does not exceed for any trade 30 per cent., and the number of cases included is at the same time considerable, it might, perhaps, be allowable to assume that they comprise a repetition of the *known* causes, and in the same ratio. The greater importance of ascertaining the cause is, however, accompanied in very many or most instances by the greater difficulty in tracing it. Thus, selecting from the table those risks remarkable for a large percentage of total destruction, we find that in 123 fires among builders, presenting 20·3 per cent. totally destroyed, the unknown causes constitute 59·4 per cent.; of 20 fires among cork cutters, with 20 per cent. totally destroyed, 60 per cent. are from unknown causes; of 11 fires among floor-cloth factories, with 45·4 per cent. totally destroyed, 90·9 per cent. are from unknown causes; of 13 fires among steam mills, with 23·1 per cent. totally destroyed, 57·5 are from unknown causes; and so on.

When it is borne in mind that the percentage of total damages for the whole number of fires in the twenty-four years has been only 3·6, and that the average of the whole table shows only just the same quantity, it is most interesting to note the variation among the different trades of the respective proportion of fires attended with entire destruction. It is true that many instances of total loss have been occasioned by the distance from town or from the nearest engine station, or by the accident of a scanty supply of water; nevertheless it is sufficiently evident (considering the number of years and events embraced) that the businesses just enumerated, with others similarly distinguished in the table, have a particular tendency to produce unusually serious conflagrations.

Of such risks as are considered least hazardous by the Insurance Offices, and which are rated accordingly, it is noticeable that churches and chapels show the largest, and a very considerable, percentage of total destructions, viz. 8·8, a higher proportion than among carpenters, japanners, lampblack makers, musical instrument makers, varnish makers, and many other extremely dangerous businesses. One among other reasons for this, probably, is, that places of worship being ordinarily left unoccupied and unwatched, when not in use, the fire has opportunity to develope itself and obtain a firm hold of the premises before attracting attention by showing itself. It is worthy of remark, too, that 60 per cent. of the total damages in this class of property are occasioned by flues, furnaces, and stoves.

Among the trades which have furnished no instances of total destruction, it is remarkable to find the following:—33 colour-makers, 17 illicit distillers, 129 lucifer-match makers, and others accounted of considerable hazard; 6 fires among printers'-ink makers were all either total or considerable; and 34 fires in theatres show no medium between either entire destruction or merely slight damage.

Of the trades enumerated in the table as giving a large proportion of suspicious and wilful fires, we have the following unusually prominent:—

	Suspicious.	Wilful.
127 Farming-stock fires	10·2	14·4
7 Mast and block makers	14·3	14·3
7 Paper mills	—	28·6
101 Unoccupied	6·9	7·9
70 Warehouses (not Manchester)	—	8·6
29 Wharfingers	6·9	10·4

And as the damages arising from spontaneous combustion are, in the table, in all cases included among the causes connected with trade (both on account of the combustion usually arising from the peculiar nature of the materials kept in stock, and also as giving opportunity for fuller description of the precise materials originating the fire), we have an opportunity of observing an apparent connection between the liability to spontaneous combustion and an excessive proportion of suspicious and wilful fires, which probably deserves serious attention.

I have already referred to Mr. Samuel Brown's paper on the London Fires, published in the *Assurance Magazine*, and which, for the great variety of the facts remarked upon and the interesting manner in which Mr. Brown has treated them, deserves and will well repay the attention of everyone interested in the subject. The results obtained, however, by Mr. Brown, as to the appropriate rate of premium consonant with the risk of each particular trade for which he calculated, were widely diverse from the rates which are apportioned to those risks by the most experienced Fire Offices. Mr. Brown's method of deducing the rate *absolutely* was, without doubt, the most simple in theory possible, and was that which his intimacy with another branch of insurance would most readily suggest to him. But it laboured under three material disadvantages, viz.:—(1) the great difficulty of ascertaining, even approximately, the number of persons carrying on each trade during the term of years under consideration; (2) the necessarily *arbitrary* assumption of the proportional value of a "considerable" and a "slight" damage, as compared with a total loss; and (3) the difficulty of classifying the immense variety of fire risks for the purpose of deducing rates of premium.

The first is a point peculiarly affecting Mr. Brown's method; the second, I would submit, is a difficulty which cannot be overcome without the very great labour of estimating, in the case of every separate damage, its percentage of the total value of the property at risk; the third difficulty is practically insuperable, as I shall attempt to show in conclusion.

Now, if the returns gave *for each trade* the total number of fires, with their causes, happening respectively in the business and in the private part of the tradesman's premises (or rather, distinguishing between those traced to dwelling and trade origins respectively—for a cause connected with business might very probably develope itself occasionally in the dwelling part of the premises, and *vice versâ*), a table similar to the one contained in this paper would offer a mode of deducing the rate which, although sharing in part some of the above objections, would escape the difficulty just mentioned as peculiarly attendant on Mr. Brown's method.

On this system of stating the causes, we should probably have something like the following for the casualties among (for instance)—

Bakers:	Causes connected with business—		
	Ovens overheated, &c. . .	10 per cent.	
	Various other trade causes .	50 „	
		—	60 per cent.
	Causes connected with dwelling—		
	Candle	5 „	
	Curtain	16 „	
	&c.	&c.	
		—	40 per cent.

Then if it were taken for granted that the appropriate rate for a private house (*i. e.*, the normal or lowest premium taken) is 1*s.* 6*d.* per cent., viz.—real risk, 9*d.*; expenses and profits, 9*d.* (and I am inclined to think that the experience of most of the Fire Offices will approve this division as safe), we could compare the risk of a baker (assuming the quantitative value of each cause to be identical) on the following principle. A baker's risk having all the hazard of a private house + that of the trade, and it being observed as above that about 60 per cent. of the total damages happening to bakers' premises arise from trade causes—if 9*d.* is the value of the absolute risk of a private house, 1*s.* 10½*d.* would be that of a baker (by the proportion 40 : 100 : : 9*d.* : 1*s.* 10½*d.*), and the total premium should be—

Real risk	1*s.* 10½*d.*	
Expenses and profits .	0*s.* 9*d.*	
	————	2*s.* 7½*d.* per cent.

And similarly for other trades. While, also, if this mode of deduction were carried out systematically, we should be enabled eventually, by observing the results of a business conducted on this principle, to adjust our initial rate from 9*d.* to whatever other charge might prove to be more equitable.

Yet it must be borne in mind that the above process would give us the correct rate for the *average* baker's risk only, and (as will be observed subsequently) we must vary the charge according to many other conditions; particularly as to whether the premises are brick built, or brick and timber built. We should, therefore, have to diverge from the above rate in the opposite directions of diminution and increase in order to include all the varieties of risk, the *average* rate for all bakers being 2*s.* 7½*d.*

With respect to the suggestion here made for deducing rates of premium by comparing the casualties in one risk with those in another (without the necessity of ascertaining the total numbers of each risk extant), it is evident that as, in the present returns, *any fire occurring in a baker's house is entered among the fires in private houses,* the speculation is entirely vague, as far as the returns in our possession are concerned. I have put the idea forward as a speculation merely, and one possible to be acted on, provided the data are so shaped in their collection as to facilitate it. For this purpose, the modification required in the present system of registering the returns would be but slight; and although I have no doubt that the existing plan was devised deliberately and for sufficient reasons, yet I am equally sure that if *any* particular method of deducing rates from the returns of fires promised an availably reliable issue, it would be the desire of all parties concerned to promote and adopt such a mode of registration as would most facilitate the desired result.

But it is, after all, the third difficulty I have stated which stands in the way of *every* systematic method of calculating fire premiums, whether on analogous principles to the mode of computing life premiums or otherwise: a few remarks, therefore, on this subject, will not perhaps be out of place in the transactions of this Institute, a majority of whose members, I am aware, undervalue the difficulty. They point to what they are pleased to consider the superior exactness of the charges for life assurance, and invite an emulation in accuracy.

Now in classifying *lives* for assurance into different ages, a year apart, we have just as many simple risks as the number of years in the duration of life, and all healthy persons of the same age are charged at the same rate for an ordinary assurance. These normal lives alone supply almost the entire business of most Assurance Offices, and the premiums charged thereon do not differ materially among all the Offices.

The analogous class of fire insurances would be for normal risks (a private house, a baker's shop, a carpenter's workshop with one bench only, &c., and all brick built and in the safest situation), and the appropriate rates for these insurances are as well ascertained and settled as those for the ordinary life assurances just mentioned. Inquiries at twenty or thirty different Fire Offices, as to their charges for these risks, would obtain the same quotation to a penny.

But in drawing up a list of the varieties of fire risks for the purpose of classification, with a view to apportioning correct charges for insurance, we cannot confine our attention to what may be called the normal risks as above; but we have as many different risks as the sum of *all* the combinations of *all* the different possibilities of *construction, situation, occupation,* &c. &c. In fact, we enter on a far wider field than is presented by all the varieties of *diseased* and *foreign residence* lives. To include under the one head of carpenters (for instance) all such as practise that trade in all its gradations, will be to group together risks of more diverse hazard than those of an oilman and a butcher: for just as the risk of a life of forty years of age, resident in England, is different from that of the same life in Cayenne, so there is a wide diversity (requiring a variation of rate) between the hazard of an insurance for a carpenter using one bench, and for another with ten benches, and for another adding the use of a drying stove, &c. To find by statistical observations, therefore, the correct *average* rate for a carpenter, will not suffice, since he who uses one bench should not and *will not* pay beyond his own risk to make up for the hazard of his fellow using ten.

Before the present century, the rates charged for fire insurances were much nearer in system than at present to those now in use for life assurances. All risks were lumped into a very few rough divisions; in consequence of which, the lowest risks paid, then, more, and the most hazardous risks far less, than now. Indeed, a century since, there were but *two* rates of premium in use, and those dependent only on the *construction* of the premises—viz., 2*s.* per cent. for brick and 4*s.* per cent. for brick and timber buildings and their contents; so that, in the business of one long-established Office at least (and I dare say of several others), such extreme instances may be found as the insurance of very large sums on Drury Lane Theatre at 2*s.* per cent., being brick built, and on the Pantheon Theatre (now occupied as a bazaar) at 4*s.* per cent., on account of its being partly timber built; whereas, the current rates for such risks, and which experience has shown to be justified, vary from 2½ to 4 guineas per cent. And the only deviations, for a very long period, from those two rates of 2*s.* and 4*s.*, occurred in cases in which an Office insured a considerable amount on any one risk, when a higher rate was frequently demanded on such account merely.

But for many years past the Fire Offices have been continually graduating their rates among the different risks, according to all the various circumstances which their experience has shown to influence the hazard of each. The steady carrying out of this plan in the practice of fire insurance, and the addition of extra charges for such of the processes or peculiarities of any trade as their statistics have proved to be fraught with danger, have enabled the Offices from time to time to modify their premiums, and, in the year 1825 particularly, to reduce the rates on the least hazardous insurances as much as 25 per cent.: at the same time that the premiums on certain businesses, inadequately rated up to that time (among others, candle makers, tallow melters, cabinet makers and carpenters, coach makers, coopers, printers, &c.), were considerably increased.

Thus it would appear that, having due consideration to the great difficulties of systematically deducing fire premiums from the *general* statistics of fires, the Offices, instead of resisting on that ground all reform in their charges, have based their premiums on their own experience, and have succeeded in effecting important reductions from the original rates for normal insurances; while their premiums on special and extremely hazardous property are proved correct by the agreement of competing Companies, and the speedy dissolution of nearly all those Offices which have from time to time been started to undersell them in any material degree. And when the Life Offices, abandoning their present rough-and-ready system of charging all moderately healthy persons of equal age the same premium, proceed to vary the rate according to the profession of the assured, his diet, his usual amusements, the conditions and neighbourhood of his residence, and the many other influences attendant on his life (all to be defined and restricted by warranties on the policy), then, and not till then, will they hold a position in which they can consistently reprove the inaccuracy of fire premiums, vaunt the superior exactness of the life tables, or show the difficulties of an improved system to have been overrated.